IN THE CLAIMS:

Claims 1-29. (Canceled)

Claim 30. (Previously presented) An integrated lab-on-a-chip diagnostic system for carrying out a sample preparation process on a fluid sample containing cells and/or particles, the system comprising the following components formed on a common substrate:

- (a) an inlet for a fluid sample;
- (b) a lysis unit for lysis of cells and/or particles contained in the fluid sample;
- (c) a nucleic acid extraction unit for extraction of nucleic acids from the cells and/or particles contained in the fluid sample;
 - (d) a reservoir containing a lysis fluid;
- (e) a reservoir containing an eluent for removing nucleic acids collected in the nucleic acid extraction unit;

wherein the sample inlet is in fluid communication with the lysis unit, and there is optionally a valve to control the flow of fluid therebetween;

wherein the lysis unit is in fluid communication with the nucleic acid extraction unit, and there is optionally a valve to control the flow of fluid therebetween;

wherein the reservoir containing the lysis fluid is in fluid communication with the lysis unit, and there is a valve to control the flow of fluid therebetween;

wherein the reservoir containing the eluent is in fluid communication with the nucleic acid extraction unit, and there is a valve to control the flow of fluid therebetween, and

wherein the system further comprises a single pump or syringe for actuation of all liquids.

Claim 31. (Previously presented) A system as claimed in claim 30, further comprising (g) a nucleic acid reaction unit, wherein the nucleic acid extraction unit is in

fluid communication with the nucleic acid reaction unit, and there is optionally a valve to control the flow of fluid therebetween.

- Claim 32. (Previously presented) A system as claimed in claim 30, further comprising (h) a waste unit, wherein the waste unit is in fluid communication with the lysis unit, and there is optionally a valve to control the flow of fluid therebetween.
- Claim 33. (Previously presented) A system as claimed claim 30, further comprising (i) a reservoir containing a washing solvent, which reservoir is in fluid communication with the nucleic acid extraction unit, and there is optionally a valve to control the flow of fluid therebetween.
- Claim 34. (Previously presented) A system as claimed in claim 33, further comprising (j) a reservoir containing a further washing solvent, which reservoir is in fluid communication with the nucleic acid extraction unit, and there is optionally a valve to control the flow of fluid therebetween.
- Claim 35. (Previously presented) A system as claimed in claim 34, wherein the reservoir containing the eluent is in fluid communication with the reservoir containing the first washing solvent and/or the reservoir containing the second washing solvent.
- Claim 36. (Previously presented) A system as claimed in claim 35, wherein the eluent, the first washing solvent and/or the second washing solvent are contained in a common reservoir.
- Claim 37. (Previously presented) A system as claimed in claim 36, wherein the eluent, the first washing solvent and/or the second washing solvent are separated from one another in the common reservoir by a fluid.

- Claim 38. (Previously presented) A system as claimed in claim 36, wherein the common reservoir comprises a conduit in fluid communication with the inlet and the lysis unit.
- Claim 39. (Previously presented) A system as claimed in claim 30, further comprising a filtration unit, which unit is in fluid communication with the lysis unit.
- Claim 40. (Previously presented) A system as claimed in claim 39, wherein the filtration unit comprises one or more of a dead-end filter, a cross-flow filter, a gravity settler, a centrifuge, an acoustic cell filter, an optical trap, dielectrophoresis (DEP), electrophoresis, flow cytometry and adsorption based methods.
- Claim 41. (Previously presented) A system as claimed in claim 30, wherein the lysis unit further comprises a filter to filter the fluid sample.
- Claim 42. (Previously presented) A system as claimed in claim 41, wherein said filter comprises one or more of a dead-end filter, a cross-flow filter, a gravity settler, a centrifuge, an acoustic cell filter, an optical trap, dielectrophoresis (DEP), electrophoresis, flow cytometry and adsorption based methods.
- Claim 43. (Previously presented) A system as claimed in claim 30, wherein the system further comprises a heater for heating the contents of the lysis unit and/or the nucleic acid extraction unit.
- Claim 44. (Previously presented) A system as claimed in claim 43, wherein said heater comprises one or more Peltier elements located in or adjacent the lysis unit and/or the nucleic acid extraction unit.
- Claim 45. (Previously presented) A system as claimed in claim 30, wherein the nucleic acid extraction unit is at least partially filled with silica beads or particles.

- Claim 46. (Previously presented) A system as claimed in claim 45, wherein the nucleic acid extraction unit further comprises one or more sets of electrodes adjacent the silica beads or particles for collecting and/or preconcentrating the eluted nucleic acids.
- Claim 47. (Previously presented) A system as claimed in claim 46, wherein said one or more sets of electrodes comprises platinum electrodes.
- Claim 48. (Previously presented) A system as claimed in claim 30, for extracting nucleic acids present in a biological fluid, a dairy product, an environmental fluid, or drinking water.
- Claim 49. (Previously presented) An apparatus for the analysis of biological and/or environmental samples, the apparatus comprising a system as defined in claim 30.
- Claim 50. (Previously presented) An assay kit for the analysis of biological and/or environmental samples, the kit comprising a system as defined in claim 30 and means for contacting the sample with the system.
- Claim 51. (Previously presented) An apparatus as claimed in claim 30 which is disposable.

Claim 52-58. (Canceled)

Claim 59. (Previously presented) The diagnostic system of claim 30 wherein: the reservoir containing the eluent is in fluid communication with the inlet, and there is optionally a valve to control the flow of fluid therebetween.

Claim 60. (Previously presented) The diagnostic system of claim 30 wherein: the reservoir containing the lysis fluid is in fluid communication with the inlet, and there is optionally a valve to control the flow of fluid therebetween.

Claim 61. (Previously presented) The diagnostic system of claim 30 wherein: the reservoir containing the lysis fluid is in fluid communication with the inlet, and there is optionally a valve to control the flow of fluid therebetween; and the reservoir containing the eluent is in fluid communication with the inlet, and

the reservoir containing the eluent is in fluid communication with the inlet, and there is optionally a valve to control the flow of fluid therebetween.